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Hybrid Recommender System for Increased Efficiency of Direct Mailing Campaigns

Master's thesis (30 ECTS)

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Abstract:

The utilization of predictive analytics techniques can support companies in direct marketing initiatives. The goal of this work is to identify customers who are most likely to buy specific products via personalized email campaigns. The data used in the thesis was collected from a large manufacturing corporation.

The work aims to solve this problem by building a hybrid recommender system by applying a linear combination of several models, where each of them requires the input data in different formats. Collaborative filtering and market basket analysis are used to incorporate customer purchasing data. Furthermore, usage of feature-based model allows to take into account customer attributes. Process mining is used to extract the process models of the customers' behaviour for the purpose of identifying the set of the most important features. The experimental results show that with the best model when contacting 0.5% of loyal customers the expected success rate would be 93% instead of 15% which we would get if the emails are distributed in a random manner. In addition to this, the results suggest that loyalty of the customer is a crucial point in the performance of the model whereby leading to loyal customers being more easily predictable. Finally, the discriminative power of content-based filtering together with market basket analysis yields the best-performing model, which marketing departments could use to more effectively promote and sell products.

Keywords:

Predictive analytics, recommender systems, direct marketing

Hübriidne soovitussüsteem otseturunduskampaaniate tõhususe tõstmiseks

Lühikokkuvõte:

Ennustamisanalüütika meetodid on tõhus viis aitamaks ettevõtteid otseturunduskampaaniate planeerimisel. Käesoleva töö peamiseks eesmärgiks on tuvastada kliente, kes võiksid personaalsete pakkumiste tulemusena olla kindlate toodete potentsiaalsed ostjad.

Käesolevas töös kasutatakse analüüsiks ühe suure tootmiskorporatsiooni andmeid. Antud magistritöös lähenetakse püstitatud probleemile, kombineerides mitu meetodit lineaarse mudeliga üheks hübriidseks soovitussüsteemiks. Klientide ostuandmeid töödeldakse enne mudelisse lisamist koostööfiltri- ja ostukorvianalüüsi abil. Tunnustepõhine mudel võimaldab lisada erinevaid klientide atribuute. Protsessikaevemeetodeid kasutatades leitakse klientide käitumismustreid tunnuste olulisuse hindamiseks. Eksperimendid näitavad, et võttes ühendust 0.5%-ga lojaalsetest klientidest, võib parimat mudelit kasutades oodata 93% positiivseid vastuseid. Kui valida sama palju kliente juhuslikult, on edukuse määr 15%. Lisaks sellele näitavad tulemused, et klientide lojaalsus on üks olulisematest aspektidest mudeli headuse puhul, kusjuures lojaalsete klientide käitumine on lihtsamini ennustatav. Parim mudel saavutatakse kombineerides sisupõhilist filtrit koos ostukorvianalüüsiga ning tulemused näitavad, et antud mudelit saab kasutada toodete efektiivsemaks turundamiseks.

Võtmesõnad:

Ennustamisanalüütika, soovitussüsteemid, otseturundus

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